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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE • AUGUST 31, 1946

Trailing Glacier

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A SCIENCE SERVICE PUBLICATION

1921 TWENTY-FIFTH ANNIVERSARY 1946

EDUCATION

Teen-Agers View Navy

U. S. Navy, in cooperation with Science Clubs of America, will play host to 110 young scientists, providing them a first look into Navy science.

➤ TO SEE science at work in the Navy, a group of 110 teen-age boys picked as "Navy science cruisers" will spend five days at the end of September flying in Navy planes, going to sea aboard a big aircraft carrier and cruising in a battleships up the Atlantic coast.

The first postwar chance for young civilians to see Navy science in action is an activity of the Navy's Office of Naval Research working in cooperation with Science Service's Science Clubs of America.

Each Navy science cruiser will be identified with a specially designed brassard and will be required to keep a careful log of his observations to be turned over to the Navy at the end of the cruise.

The 110 boys named as Navy science cruisers were chosen through Science Clubs of America, the several boards of education and participating newspapers from the areas of New York City, Philadelphia, Pittsburgh, Providence, R. I., and Washington, D. C. Each boy was picked for ability in science shown by school records and achievement in events such as a science fair, science congress or the Annual Science Talent Search this year.

As guests of the U. S. Navy, the boys will fly from their home cities to Washington, D. C., and go on to Annapolis for a visit to the U. S. Naval Aacdemy. There they will board the U.S.S. Randolph for a cruise at sea. From this aircraft carrier an air show will be staged for them. Putting into Norfolk, Va., the party will board the U.S.S. Washington and the U.S.S. North Carolina and get acquainted with battleships as they cruise to New York City. A trip to Floyd Bennett field will complete their Navy science cruise and they will be returned to their home cities by Naval Air Transport.

Vice Admiral Harold G. Bowen, Chief of the Office of Naval Research, commenting on the Navy science cruiser program said, "As a result of the war and the lessons learned, it becomes essential that our new generation stress more than ever their education in science.

"This is necessary for several reasons: First, our country badly needs a new crop of research scientists to enable us to hold our own in the acquisition of new knowledge; second, an education in science is essential for our children to take their proper places in the new technological world; third, an education in science is essential in order that our young men will form a large reserve for future national defense which will depend to a much greater extent than heretofore on science."

Science Clubs of America, the organization for young scientists, with headquarters in Washington, D. C., has more than 250,000 boys and girls as members. It provides a year-round program for the more than 10,000 clubs affiliated and sponsors the Annual Science Talent Search for the Westinghouse Science Scholarships.

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GENERAL SCIENCE

Scientists To Be Deferred

➤ SCIENTISTS and technical workers and teachers in research laboratories, industry and colleges will not be drafted into the armed forces in coming months as the result of a reversal of selective service policy.

This allays great concern among industrial, research and educational authorities over threatened drastic cancellation of deferments for scientific workers who have been deferred throughout the war to do essential war research.

Selective Service has issued to local boards a revised Memorandum 115 concerning such deferments. This about-face resulted from a request to Selective Service from Director John Steelman of the Office of War Mobilization and Reconversion, following a White House conference on July 23, when the disastrous effect of indiscriminate drafting of scientists, engineers and college teachers was made clear.

Information assembled by Dr. M. H. Trytten, director of the National Research Council's Office of Scientific Personnel, showed that the proposed cancelling of deferments of scientific workers would have removed 12% to 20% of the professional scientific personnel of industrial laboratories in many cases. Universities would have lost 40% to 50% of their technically trained teachers and research workers.

The new policy allows deferment for those engaged in college teaching, advanced studies and university, industrial or foundation research in the physical sciences and engineering, supervisory, technical or scientific personnel "whose removal would significantly retard production in industries essential to reconversion and otherwise necessary to the national existence," and qualified and irreplaceable production workers in industries designated as critical by the Civilian Production Administration. Production workers included are those in veterans' housing, public health, food and famine relief, etc.

The Office of Scientific Research and Development will certify graduate students and research workers for deferment, the Office of Education will certify teachers, and the Civilian Production Administration will certify production workers.

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MEDICINE

Fever Blister Virus May Cause Brain Disease

➤ THE VIRUS that causes fever blisters and cold sores may also cause the serious brain inflammation, encephalitis. The cold sore virus was isolated from the brains of two men who died of encephalitis, Maj. Loring Whitman, Miss Margaret J. Wall and Capt. Joel Warren, of the Army Medical Center, report in the *Journal of the American Medical Association* (Aug. 24). No mention of cold sores or fever blisters appeared in their medical histories, however.

When an epidemic of encephalitis, popularly known as sleeping sickness, swept around the world after the first World War, some scientists thought the cold sore virus was the cause of the disease, because it was isolated from spinal fluid or brain of patients. Other scientists did not agree.

Recent evidence besides that reported by the Army medical team now shows that the virus of cold sores and fever blisters, known medically as herpes, can cause encephalitis.

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AGRICULTURE

Blight Threatens Crops

Tomato blight is attacking crops in nationwide epidemic, causing great damage. New chemicals are proving successful controls.

▶ IF THERE is a shortage in canned tomatoes and tomato juice this winter, it can be blamed on one of the most severe epidemics of the tomato blight disease that has ever struck the country. Already this fungus plague has caused serious loss to the tomato crop in Maryland, Delaware, New Jersey and Pennsylvania, states Dr. J. E. Heuberger, professor of plant diseases at the University of Delaware.

Fast becoming a headache in the headachy business of food production, this vicious fungus, which runs in cycles and is now at the crest of a cycle, has already struck many of the most important growing areas. The infection has moved up the Atlantic seaboard, from Florida into Georgia, then into the Carolinas and Virginia, thence over Maryland, Delaware, New Jersey and Pennsylvania.

All possible means of control, including airplanes, are being used, but there is no adequate control equipment in many areas since growers never before needed it.

Dr. Heuberger explains that until recently the growers' only weapon against the blight has been copper. This year, however, several new organic fungicides are being used to combat the disease. Various dithiocarbamates have proved effective. Two of these are disodium ethylene bis dithiocarbamate and zinc ethylene bis dithiocarbamate.

These chemicals have also been used against the blight where it has struck potatoes. Growers around Homestead, Fla., are said to have average yields of 100 bushels per acre higher under the new treatment than during previous years when only the old copper treatment was used.

Several experiment stations have reported that the dithiocarbamates are compatible with DDT, and make an excellent dual-purpose treatment for the control of insects and fungus disease on potatoes.

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***"EXAM" BIRD**—This rare skeleton was created by osteologists of Ward's Natural Science Establishment of Rochester, N. Y., for a college professor to use in testing students in comparative anatomy. The bird was fabricated from the hind legs of a cat; the backbone, wings, breastbone (without wishbone) and neck of a chicken; and the skull of a gar pike (a fish).*

AERONAUTICS

Supersonic Plane Drive On

Race to build aircraft to beat the speed of sound is on in earnest. British and American rocket-powered models are ready for demonstration.

▶ THE RACE to beat the speed of sound with airplanes is on in earnest. British air officials announce that British engineers have plans for aircraft that will fly faster than sound, that models will be built and air-tested, and that later a full-size supersonic plane will be built.

These models will be rocket-powered and pilotless. They will be taken aloft and launched from ordinary aircraft, the London Transatlantic Daily Mail states. They will be guided by radio control, and will automatically "tell" the parent plane how they are behaving by means of radio-telemetering.

Radio-telemetering is an electronic system that measures stresses and strains and reports the results constantly to a ground station or perhaps to an accompanying plane. An American type installed in U. S. Navy planes demonstrated recently how well a plane without a pilot can be guided in the air and its performances recorded.

America's entry in the supersonic speed race is the Army-Bell Aircraft XS-1, built according to principles learned by scientists of the National Advisory Committee for Aeronautics in its laboratories and supersonic and other wind tunnels.

The XS-1 has already been thoroughly tested without power in glider and diving performances, and will soon be given try-outs in gradually increasing speeds when its rocket engines are installed. The supersonic test will be made later. Under present plans, it will not be pilotless. The same man who has handled it in the tests already made is expected to guide it in the break-through of the supersonic wall.

Other English developments in aviation parallel those in America, with perhaps more stress placed on gas-turbine and jet-propulsion than is emphasized in this country. The English have a 30,000-pound "flying wing" powered with turbo-jets that may be in the air later this year. They have a tailless airliner powered by four jet engines that will be put into commercial service over the Atlantic by 1950, it is expected.

An English jet-propelled Gloster Meteor climbed recently to an altitude of 46,500 feet, and reached an unofficial speed of 630 miles an hour, it is reported. Its official speed is 606 miles an hour.

Britain's new jet helicopter gave its first public demonstration recently, it is announced. Laterally directed jets directed sideways against the tail provide directional and torque control. The fan blades give it lift and forward motion as in American helicopters.

An English air official has just given information relative to a new aerodynamic research station to be erected at Thurleigh at a cost of many millions of dollars, that will have the most modern equipment including supersonic wind tunnels. This is designed to help England keep to the front in aviation.

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PHYSIOLOGY

Easiest Way Is Best

Advice to housewives for efficiency in housework: maintain good posture, have shelves and work surfaces conveniently placed, and relax.

➤ THE EASIEST way to carry a heavy basket, climb stairs and sit in a chair is often the best way. Housewives, like efficiency engineers and factory workers, can study their motions in performing daily tasks so as to improve their methods, save energy and develop a good body carriage.

The feet should be apart when standing for your work so as to give a broad base and easy shift of weight. This will permit a wide range of movement, remind Dr. Helen Denniston and Margaret P. McCordic of the University of Wisconsin's College of Agriculture. Point the toes ahead to prevent strain on ankle and instep. Pull the abdomen up and hips down to hold the pelvis steady as a base for the spine. Lift the breastbone to allow heart and lungs plenty of room.

Supplies arranged in a circular manner around you are easier to reach. When they are beyond your reach, save time and energy by taking one long step instead of several shuffling ones.

Good posture going up stairs saves energy as well as being graceful. The body slants forward from the rear ankle. The entire forward foot is placed flat on the next step, and the body lifted by the large hip and leg muscles.

Keep the same erect posture when coming downstairs. While the toes, pointing straight forward, reach for the next step, the weight is received on the ball of the foot with an easy "giving" bend in the knee and ankle, Dr. Denniston and Miss McCordic point out.

When baskets or other objects to be carried have handles, the weight can rest against the hip. The weight, balanced by bending toward the other side, is then transferred directly to the large bones and muscles of the legs.

All work surfaces should be a little below elbow level. Large blocks with a cavity in which the legs fit is good in elevating a table or bed to a suitable height for the worker. When the kitchen sink is too high for young helpers, have a broad platform handy for them to stand on while working.

Time and energy when ironing large pieces such as curtains or towels can be saved by fitting a wide board firmly over the ironing board. Because of the greater range of movement, it is more effective to stand than sit when ironing.

The position of the body when sitting down and getting up is fully as important as your posture while seated. With one foot back, the body weight can be shifted over the seat of the chair and lowered onto it by bending the knees. The trunk remains erect and arms relax into the lap. Reverse the movement when rising.

It is better to sit instead of stand when preparing vegetables or fruit. A low table or lap board, just above the lap, is excellent for this type of work.

When sweeping, place the hands far apart with one hand near the top of the broom handle. Bending from the hips and swinging the whole body from widely spaced feet makes sweeping a good exercise. By changing the position of your hands and direction in which you are sweeping, both sides of the body benefit.

There are three good positions for low work. A squatting position with one knee down and back straight is good when using a short-handled dust pan. The deepknee bend is fine for collecting many small objects spilled on the floor. When picking up a pencil or thread, bend from the hips and keep the knees straight.

A chair should be lifted and carried with its back against the body, as most of the weight is at the back of the chair. Carrying a partially-filled pail or basket in each hand is easier than handling one full pail.

Learn to relax, Dr. Denniston and Miss McCordic advise in a pamphlet on how to make work easier around the house. Lie down on your back at full length on a bed or couch. A small rolled blanket placed under partly bent knees or your lower back may make you more comfortable.

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AERONAUTICS

Low-Drag Promotes Speed

► LOW-DRAG wings for airplanes, known technically as laminar flow wings, were made practical during the war by the National Advisory Committee for Aeronautics, it is now revealed. Applied to both fighters and bombers, this aerodynamic principle contributed greatly to the superiority of American aircraft.

The low-drag airfoil principle, one of America's top secrets during the war, was disclosed by Dr. J. C. Hunsaker, chairman of the NACA. Employment of the low-drag principle enables a plane to fly faster and farther, he said, by virtue of its low drag. By a coincidence, he added, the pressure distribution which promotes smooth air flow also permits a higher flight speed before the onset of compressibility shock.

Laminar flow, as applied in aerodynamics, is a type of streamlined flow of the air over and under the airfoils or wings with a constant or steady motion of the air particles near the body of the wings, and with a minimum of eddying or turbulence. The term is used in contrast with turbulent flow, which is an unsteady air movement, with the air velocity varying at any given point in magnitude and direction.

In disclosing the principles of laminar flow as applied to aircraft, Dr. Hunsaker gave full credit to European scientists who applied them to correct form for ships, and to later men who, in the early days of airplanes and with no knowledge of hydromechanics, discovered that, in a plane, an arched wing profile was advantageous.

An English scientist named Lanchester, he said, showed how a wing would cause the air to rise to meet it and then descend. He found that a vortex would trail behind each wing tip. Later, theoretical work in England and elsewhere led to a conclusion that a smooth surface and a falling pressure gradient are necessary to maintain an extensive laminar flow. Theory then seemed to have reached its limits. The practical development of the laminar flow wing was carried out at the NACA's Langley Memorial Laboratory in Virginia.

A low-turbulence pressure wind tunnel at this station, completed in 1938, made this possible. By May, 1941, the technique of airfoil design and testing at Langley had advanced to a point where low drag could be obtained. The theory served a useful part; it showed how to obtain a favorable pressure drop over the forward portion of the airfoil, and the sharp pressure recovery over the rear portion needed to prevent boundary-layer interruption and flow separation.

To obtain stable laminar flow, complete control of pressure gradients was found necessary. Work at Langley Field resulted in the discovery that the airfoil, designed to give desired pressure distribution, could be obtained with precision by an angular distortion of the curve into which the airfoil was transformed, and then correction of both the airfoil and the corresponding pressure distribution by successive approximations. The method was systematized in 1944, and reduced to engineering practice in 1945.

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CHEMISTRY

Refrigerant, Freon, Also Puts Out Gasoline Fires

► THE FREON chemical compounds that are used in household refrigerators and in air-cooling systems now have a new job. They are found to be more effective in extinguishing gasoline fires than the long-used carbon dioxide and other inert gases.

Freon is well-known to soldiers. It is the carrier for DDT, compressed into the aerosol bomb, which when released made an effective spray to kill mosquitoes and other insect pests. The Freons are harmless to men, being nontoxic, non-combustible, non-explosive and non-irritant.

The use of Freons to extinguish gasoline fires is recommended by the U. S. Bureau of Mines because of their effectiveness determined by a study of six inert gases and their effects on three different types of gasoline. The study was made by Bureau scientists and others from the Mine Safety Appliances Company.

Among the six gases tested, Freon 11 was found to be the most effective flame-quenching agent. Freon 12, Freon 21, carbon dioxide, automobile-exhaust gas, and nitrogen were next best in the order named.

Gasoline is one of the chief causes of costly fires and explosions because it is used by industry, the Bureau states, in a greater quantity and a wider range of applications than any other combustible liquid. Gasoline fires in or about mines are not uncommon.

The Freons are a series of compounds containing the same elements but in different proportions. They are made by introducing fluorine into chlorine derivatives of methane gas. Their chemical names indicate that they contain both chlorine and fluorine.

Freon 11 is trichloromonofluoromethane, a long word but easily understood when divided into syllables: tri-chloro-mono-fluoro-methane. Freon 12 is dichlorodifluoromethane, and Freon 21 is dichloromonofluoromethane. Freon 21 is probably the one most commonly used in refrigerating and air-cooling systems. Freon 11, the best flame-quenching agent among the six inert gases tested, is used in centrifugal compressors feasible only for large refrigerating or air-cooling units.

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GENERAL SCIENCE

Associated Universities, Inc. New Research Center

► WORLD'S largest cyclotron and synchrotron and a uranium pile for producing radioactive elements for laboratory work are planned for the new Associated Universities, Inc., that is going to turn the former Army camp at Camp Upton, N. Y., into an atomic research center, Dr. Philip M. Morse, professor of Physics at Massachusetts Institute of Technology and newly-appointed director of research for the institution has disclosed.

A cyclotron of 500,000,000 volts and a synchrotron of comparable size are among the items of equipment scheduled to be constructed, Dr. Morse reported.

Ten to twelve buildings will house biological, chemical, physical, medical and engineering research groups on the 3,700-acre tract. About 1,000 persons will comprise the community, including both technical and non-technical personnel.

Associated Universities, Inc., is sponsored by nine universities: Columbia, Cornell, Harvard, Johns Hopkins, Massachusetts Institute of Technology, Pennsylvania, Princeton, Rochester and Yale. Edward Reynolds of Harvard is president of the new university, and the project's scientists will not be limited to the cooperating schools.

Dr. Morse emphasized that pure research looking to peacetime applications of atomic energy will be the primary purpose of the project.

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PSYCHOLOGY

Trained Intellects Needed

Many capable men take orders instead of giving them because of lack of education. A solution: make higher education available to greater numbers.

➤ A REALLY bright truck-driver may be a more capable man than the executive who sits in the office and gives him orders.

About one boilermaker in every eleven is as able-minded as the average lawyer.

These sample findings from the Army General Classification Test, given to 10,000,000 young men during the war, are offered by Dr. Walter V. Bingham, chief psychologist of the Adjutant General's Office, to point a moral in a discussion of the general abilities of American adults. He presents his views in *Science* (Aug. 16).

His inference is that if you are inclined to be complacent about a truck-driver being better than his boss, or a boilermaker just as good as a lawyer, you are looking at things wrong-end-to. Rather, you should be asking why the truck-driver isn't giving orders instead of taking them, or why the boilermaker isn't making briefs instead of boilers.

Of the group who scored highest in the Army General Classification Test, all of them capable of absorbing a college education, only one-fourth were college graduates, Dr. Bingham points out. In a world where there is an actual famine of trained intellects and skills, he considers this tragic.

As one partial remedy, he calls for a greatly increased number of scholarships available to really superior applicants for higher education. He also thinks that all universities and colleges should have staffs of specialists to pick out and encourage the most promising students.

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ARCHAEOLOGY

Fire-Worshipers Found

➤ CENTRAL hearth believed to be the oldest remains of fire-worship in Central Asia, perhaps in the whole of the East, has been excavated in the USSR near the Aral Sea.

Fire-worshipers continuously kept alive the flame in this hearth while meals were cooked in a series of surrounding fireplaces. Primitive hunters used these fires sometime between 4,000 and 3,000 B. C., states Prof. Sergei P. Tolstov, director of the Institute of Ethnography, Moscow, and member of the Soviet expedition that unearthed the dwelling with its many fireplaces buried deep beneath the sand dunes at the foot of the Janbas Kala hills.

Janbas Kala No. 4, as the place is officially called, was a large communal dwelling with clearly defined limits. It was shaped like a polygon, and covered about 347 square yards.

The community house was built on the ground. The walls consisted of a wooden framework of posts with cross-beams for the reed-thatched roof. The post-holes, all that remain, contained black ashy earth with fragments of charcoal, and were arranged roughly in three concentric circles.

No clay was used in the building. The rafters were placed radially on top of the posts, and the spaces between them filled with open wickerwork. The plan of the fallen roof could be seen in the ashy layer above the fragments of broken earthen pots, fish bones and flint flakes. Charred reeds, the remains of the roof, were found all over the area where the house had been.

In the middle of the building was a large round hearth, about four feet in diameter. This differed greatly from the cooking hearths, rows of which were found round the perimeter of the building.

A number of features marked this central hearth as different from the others. Household objects and kitchen refuse, found in large quantities round the other fireplaces, were completely absent from the central hearth or its vicinity. The ash there also was entirely different in character. Whereas that on the cooking-hearths was black and gray, with cinders, only pure white ash, indicating complete combustion of the fuel, was found in the central hearth.

A thick layer of sand under the hearth was burnt bright red. Similar layers of sand only a fifth to four-fifths of an inch thick were found under all the cooking-hearths, but here the layer was around 20 inches thick.

The central hearth was undoubtedly of some religious significance rather than being used as a cooking-hearth, Prof. Tolstov states. Fire had evidently been burning there continuously for a long time.

Full details concerning the findings of the Soviet expedition in this important and little-known region are given in *Antiquity*, British Quarterly Review of Archaeology.

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GENERAL SCIENCE

Navy Invades Arctic With Planes, Ships

See Front Cover

➤ BASED AT Thule, Greenland, where Navy and Coast Guard vessels have penetrated the farthest north into the icefields that ships have ever sailed at this time of year, two Navy patrol planes have flown ice and weather reconnaissance missions over the Arctic within 450 nautical miles of the North Pole.

The picture on the front cover of this SCIENCE NEWS LETTER reveals an unusually long and "trailing" glacier from its mouth. It was taken from a Navy PBM as it flew west up Frederick Hyde Fjord, Peary Land, on the return leg of a 1400-mile hop.

The flights were a part of scientific studies being made of such varied subjects as cosmic rays and icebergs by the personnel on the ships at the Greenland port.

Only special equipment on the flights that reached the northernmost known land in the world was an electric compass that functioned well in the near-polar regions.

The expedition was "blacked out" by sunspots which cut off radio contacts the last week in July, but the difficulty aided the studies of scientific observers concerned with cosmic rays and radio communications problems.

In reaching the north Greenland port, the ships of the expedition sailed through iceberg-infested waters, using radar to keep clear of the North's most dangerous navigational hazards. It was reported that the southern limit of the ice pack lies farther north than usual, and this summer was described as unusually good for navigation.

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RADIO

Radio Blackouts Predicted

Huge sunspots are expected to cause occasional radio blackouts during the next year or two. National Bureau of Standards will forecast these.

➤ BLACKOUT of shortwave broadcasts during the next year or two can frequently be blamed on sunspots huge enough to be visible through smoked glass. This means they will be 50 to 100 times as large as the earth.

Only two or three years ago there were few spots visible on the sun and these were too tiny to be seen without a telescope. The number of pockmarks on the sun has been increasing since then and may reach a maximum late in 1947 or early in 1948. Prolonged, moderate disturbances are frequent during sunspot minimum. Briefer, more erratic storms tend to occur during sunspot maximum. They usually take place a day or two after a large spot passes the sun's meridian.

During the next few years radio forecasts will be more and more influenced by the number and size of sunspots. When no spots are visible during sunspot minimum, on the other hand, the tendency of storms to recur at 27-day intervals is more important in making forecasts.

Shortwave broadcasts may even be disturbed by fading and fluttering. Fading is due to signals coming in out of phase. The signals tend to interfere with each other. Fluttering is caused by scattered transmission. The beam does not follow the great-circle path closely enough.

When an ionosphere storm is in progress, lower frequency must be used as higher ones escape through the ionized layers. On the other hand, more and more of the lower frequencies are absorbed and fail to reach the receiving station. When the frequency band is so reduced at both ends that nothing gets through, radio broadcasts are completely blacked out.

Twice a week the National Bureau of Standards predicts how good reception of shortwave broadcasts from Europe will be. This is based on the number and position of sunspots, condition of the radio reflecting layers, magnetic storms and other data. Twice each hour it issues up-to-the-minute warnings. These are based not only on conditions on the sun and in the ionosphere, but upon how well shortwave broadcasts here on earth are getting through.

These forecasts are being developed to the point that those listening to a world-wide hook-up will no longer be bothered by having a broadcast from Europe ruined by sputters or by fading out.

In making these long-range and up-to-the-minute forecasts, the National Bureau of Standards uses data supplied by laboratories at Stanford University, Louisiana State University, University of Puerto Rico, Harvard University, the Massachusetts Institute of Technology, and others. In addition, help is received from the Department of Terrestrial Magnetism of the Carnegie Institution of Washington, which is now maintaining observatories in Peru and Australia, and also assembles magnetic data.

The large and increasing amateur-radio fraternity known as "radio hams" reports on actual transmission conditions. This, fitted in with reports from commercial companies, the Army and Navy, and the laboratories of the National Bureau of Standards, is used in making forecasts. The amateurs in turn use the forecasts to determine at what distances they can operate to best advantage, and whether broadcasts will get through.

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AGRICULTURE

Bad News About The Pepper Shortage

➤ SOME FACTS on the pepper shortage—and bad news for housewives:

Netherlands sources estimate that it will require three to four years to rehabilitate pepper culture on Bangka Island and Southern Borneo, large prewar sources of the spice.

Only one-half of one percent, or 100,000 of 20,000,000 pepper trees on Bangka are now standing, while 20% of those in Southern Borneo remain after the war's devastation.

Spice culture in the Moluccas, which were used completely for food production by the Japanese, cannot be restored to prewar levels in less than eight years.

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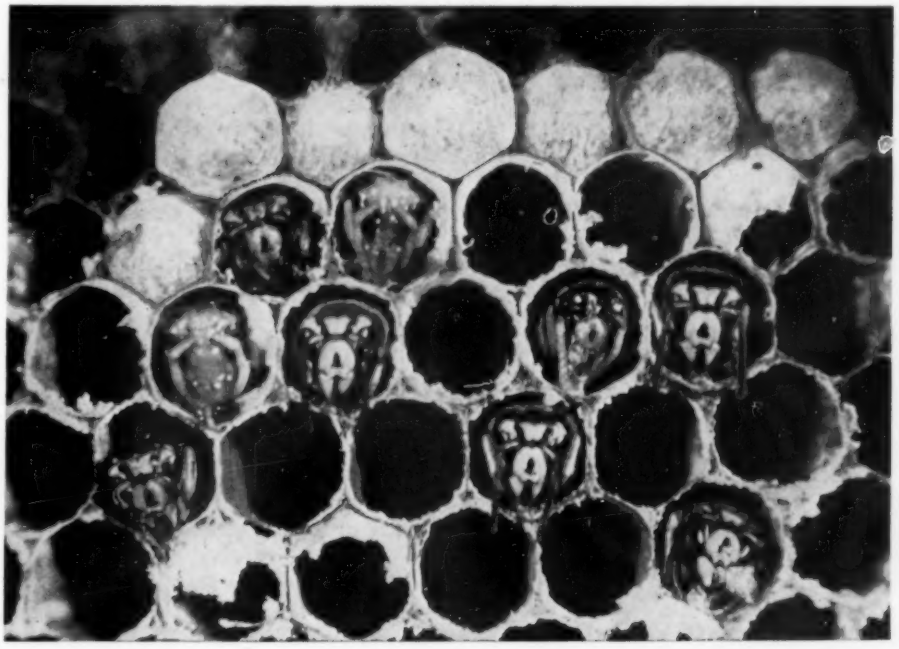


GEOMETRY—Bees are by no means the only insect geometricians. The paper wasps build combs with the same meticulous arrangement of hexagonal cylinders, except they use papier-mache instead of wax. In these snug cells they rear their young with great care. Here the camera of Lynwood M. Chase has caught a group of new-fledged adults, ready to emerge and go to work. Above them the capped cells contain larvae which are not quite as far along in their development.

METALLURGY

Silver-Magnesium Solder Withstands High Heat

➤ SILVER-MAGNESIUM solder that can withstand the temperatures within gas jet turbines was found in Germany by American investigators. It is a material that should have wide value in the United States.

In addition to its use in turbines, the solder can be used in the fabrication of stainless steel heat exchangers, exhaust manifolds, gas turbine parts and general chemical equipment where high heat is encountered.

The solder is made of 85% commercially pure silver and 15% magnesium. Addition of magnesium to pure silver in this proportion gives an alloy with excellent soldering properties, it is said, and does not lower the melting point of the silver. The solder has a melting point of 1790 degrees Fahrenheit, and retains its high strength up to 850 degrees Fahrenheit.

A report on the silver-magnesium solder with additional facts relative to it has been issued by the Office of Technical Services, U. S. Department of Commerce.

Science News Letter, August 31, 1946

GENERAL SCIENCE

Lightning Kills Science Talent Search Winner

➤ LIGHTNING, not war, was responsible for the first death among the 200 winners of the annual Science Talent Search, all highly selected boys and girls with proved talent for research.

John Taylor Hopkins IV, 18, of Washington, D. C., a 1946 winner in the fifth annual Science Talent Search, was fishing in Jacksonville, Fla., when lightning struck his steel rod and all efforts to revive him failed.

Of the 200 chosen in the first five Science Talent Searches, 146 have been boys. Of these 73 have been or are now in the armed services. Another 52 are still under draft age. Many of the 73 served on the fiercest fighting fronts in the European and Pacific theaters, and others hazarded their lives at sea and on land in service operations. Two are holders of the Purple Heart for disabling battle injuries.

But it was lightning, unconquered phenomenon of nature, that turned a gay fishing excursion into a death trip for John Hopkins. He graduated this spring as valedictorian, attended George Washington University and planned to enter Johns Hopkins University this fall on a four-year full tuition scholarship to study organic chemistry.

Outstanding work with diazo dyes earned Hopkins the honor of being chosen one of the 40 winners from 16,000 contestants in the Science Talent Search, sponsored annually by Science Service, and brought him a Westinghouse Science Scholarship.

Science News Letter, August 31, 1946

AGRICULTURE

Australian Beetle Aids In War on Weeds

➤ INSECTS that devour plants are not always man's enemies. One Australian beetle promises to become a useful ally to man in California because it eats only a certain kind of weed, known as the Klamath weed.

Success with imported stocks of the weed-eating beetle is reported by James K. Holloway, U. S. Department of Agriculture entomologist, who works in collaboration with the University of California experiment station. The beetle's usefulness, he explains, is due to the fact that the weed it feeds on, known elsewhere as St. John's wort, has no near relatives among crop or pasture plants.

About 100,000 acres of California lands are infested with the Klamath weed, and the helpful little beetles from Australia are being propagated as rapidly as possible so that they may be released in the fields.

Science News Letter, August 31, 1946

PHYSICS

Bikini Radioactivity Traced in California

➤ A FAINT radioactive echo of the Bikini blast was recorded on a sensitive electroscope at the University of California at Los Angeles on July 4, four days after the explosion. This has just been announced by Dr. Clifford Garner, who spent three years at the Los Alamos laboratory during the war.

This record at Los Angeles checks with an earlier report from San Francisco, where Geiger counters clicked slightly faster on July 4.

Air-borne radioactivity so far from the scene of the explosion was, of course, not at all dangerous.

Science News Letter, August 31, 1946

IN SCIEN

CHEMISTRY

Buttermilk Gave Clue to New Fire Extinguisher

➤ MAGNESIUM fires, easily started and hard to stop, can be put out with a new powder that owes its discovery to a glass of buttermilk.

The fire extinguisher looks like a large salt-shaker. The powder, to be shaken on the fire, is composed of eight parts talc, two parts casein powder and one part magnesium carbonate, added to keep it from absorbing moisture.

Dogged by the problem of keeping magnesium fires to a minimum, as he lunched one day, a safety engineer at Northrop Aircraft, Inc., remembered he had heard that buttermilk would put out fires. So instead of drinking his buttermilk, he experimented and found that it did retard the fire's progress. Chemists traced the fire extinguishing power of the buttermilk to casein, and mixed the talc and magnesium carbonate with it to facilitate pouring.

Science News Letter, August 31, 1946

PSYCHIATRY

More Psychiatrists Needed To Combat Mental Illness

➤ WARNING that 8,000,000 Americans are suffering from some form of mental or nervous illness, the U. S. Public Health Service at the opening meeting of the National Advisory Mental Health Council in Washington, D. C., appealed for more trained personnel, more research and demonstration projects and improved community mental health programs.

The Public Health Service estimated that 10,000,000 Americans in the current population will require hospitalization for mental illness sometime during their lives. At least four times the present number of psychiatrists are needed, with more funds for research and more community all-purpose mental clinics, the agency said.

The two-day meeting was the first for the council, set up under the National Mental Health Act. Other provisions of the act call for a National Institute of Mental Health and grants-in-aid for research and training.

Science News Letter, August 31, 1946

E FIELDS

HERPETOLOGY

Unhatched Turtles Show "Grown-Up" Reactions

➤ UNHATCHED young loggerhead turtles, taken out of their shells two weeks or more before normal time for emergence, show many of the same reactions that grown-up turtles have—swimming and crawling movements, snapping, righting themselves when overturned, and the persistent tendency to crawl seaward common to aquatic turtles.

These are among the results of a study of embryo turtle behavior made on the Florida coast by Dr. Karl U. Smith of the University of Wisconsin and Dr. Robert S. Daniel of the University of Missouri. They report on their work in *Science* (Aug. 16).

The two scientists took 55 eggs of loggerhead turtles and opened them at various intervals during their incubation period of from 45 to 50 days.

First movement of the embryo turtle was observed on the twelfth day. The animals, at this stage still shell-less and lizard-like in shape, merely bend their bodies when touched. They become able to move their legs independently about the eighteenth day, and give eyelid and mouth reactions at 22 days.

Science News Letter, August 31, 1946

CHEMISTRY

New Process Extracts Peanut Proteins

➤ TWO NEW forms of protein, good for making synthetic fabrics, adhesives and other manufactured products, can be extracted from peanut meal left after oil extraction by a newly patented process developed at the U. S. Department of Agriculture's Southern Regional Research Laboratory in New Orleans. Previous methods of extraction have brought out all the proteins at once, and they have had to be separated into fractions good for different purposes—which of course involved additional chemical treatment and consequently greater cost.

In the new process, the meal is first treated with water containing caustic soda, with its hydrogen ion potential adjusted close to the neutral point. This brings about a total extraction of proteins. The remaining solids are centrifuged out.

Acid is added to the remaining clear liquid until the hydrogen ion potential is 6. At this point a white, semi-plastic precipitate is formed that can be pulled into filaments, ribbons or sheets showing a marked sheen or gloss. It has been named "protein 6." To the remaining clear liquid more acid is added until the hydrogen ion potential is 4.5. This brings out a second white solid, which is granular and non-sticky. This has been designated "protein 4.5."

The four-man team conducting this research, consisting of G. W. Irving, Jr., A. L. Merrifield, R. S. Burnett and E. D. Parker, has assigned rights in the patent, No. 2,405,830, royalty-free to the government.

Science News Letter, August 31, 1946

PUBLIC HEALTH

Soil Disposes of Penicillin Waste

➤ PENICILLIN, conqueror of many diseases, indirectly imposes a public-health problem on the communities where it is produced, which bacteriologists at Rutgers University have been working to solve.

The problem comes from the large quantities of left-over nutrient solution on which the penicillin-producing mold has been raised. It contains a mixture of sugars, plus amyl acetate and other solvent chemicals. Poured raw into the rivers, it would constitute an exceedingly nasty kind of stream pollution, which would provoke no end of protests, and probably restrictive legislation as well.

The soil, from which penicillin originally came, has provided the answer. Dr. Willem Rudolfs and his co-workers made a mixed culture of microbes from a teaspoonful of soil, subcultures from which are able to use up the last bits of nutrient material in the waste fluid and return clean water to the streams.

Two different processes have proved successful. One can be carried on without air, in big steel tanks like ordinary oil storage tanks. The other requires air, which is bubbled through the solution in long rectangular concrete tanks.

The outflow liquid from either type of tank is seeped through sand beds, where other billions of bacteria continue to work on it, until nothing is left but water, ready to go back into circulation.

Science News Letter, August 31, 1946

ELECTRONICS

Cesium Metal Vapor Makes "Talking Lamp"

➤ CESIUM METAL vapor allows an electric lamp to talk. Such a lamp developed by Westinghouse is used to emit invisible infra-red rays over which conversation can be transmitted from an instrument known as a photophone.

Infra-red communication systems were used by both Germans and Japs during the war for distances up to ten miles where wires could not easily be stretched and radio would be a give-away. According to reports, however, they did not use cesium, sometimes spelled caesium.

The advantage of cesium, a metal of the sodium, potassium, lithium, rubidium group together known as the alkali metals, is that it is an efficient generator of infra-red waves, also a poor visible illuminant. Its low visibility minimizes requirements for a filter to block out stray visible light which would betray the presence of the signal system.

The cesium vapor lamp was designed by Dr. Norman C. Beese, Westinghouse research engineer, at the request of the U. S. Navy, but the device was not ready for use when the war closed.

Science News Letter, August 31, 1946

MEDICINE

Dual Treatment Advised For Dementia Paralytica

➤ ADVANCED cases of syphilis accompanied by psychotic symptoms can now best be treated by giving the patients penicillin as well as infecting them with malaria fever, three Johns Hopkins Hospital physicians, Drs. Frank W. Reynolds, Charles F. Mohr, and Joseph Earle Moore, advise in a report to the *Journal of the American Medical Association* (Aug. 17).

During two years 41 patients with dementia paralytica were treated with penicillin, 24 with the drug alone and 17 with penicillin administered at the same time as induced tertian malaria. There was 58% improvement for those dually treated as compared with 46% for the others.

The doctors conclude:

"The effectiveness of current penicillin-malaria therapy is such as to make it, for the present at least, the treatment of choice for patients with dementia paralytica."

Science News Letter, August 31, 1946

ASTRONOMY

Vega Shines Brightest

Planets are not well placed, but Mars, Jupiter and Venus are visible. Sept. 23 is the centenary of the first observation of Neptune and begins autumn.

By JAMES STOKLEY

➤ ALTHOUGH the planet Venus reaches its greatest distance east of the sun on Sept. 8, it will not then occupy the position high in the western sky that it normally does under such circumstances. However, it can easily be seen low in the southwest at dusk, with magnitude of minus four, much more brilliant than any other star or planet. The poor position of Venus comes from the fact that it is far south. Thus, its great distance from the sun merely takes it along the horizon, and not up into the sky.

Because it sets so soon after the sun, Venus does not appear on the accompanying maps, which indicate the sky's appearance for 10:00 p. m., standard time on Sept. 1, and an hour earlier in the middle of the month.

Brightest star shown on these maps is Vega, in Lyra, the lyre, which is high in the west, almost overhead. Directly overhead is the figure of Cygnus, the swan, with first magnitude Deneb. Altair, in Aquila, the eagle, is a little to the south.

In addition there are three other stars shown which are of the first magnitude but all are down near the horizon, where the atmosphere through which their light has to travel on the way to us causes a diminution in their brilliance. Low in the southeast is Piscis Austrinus, the southern fish, with Fomalhaut. To the northwest is Arcturus, in Bootes, the bear-driver. Capella, in Auriga, the charioteer, is in the northeast, reappearing after several months' absence from our night time skies. During the winter it will come into greater prominence.

Mars and Jupiter Visible

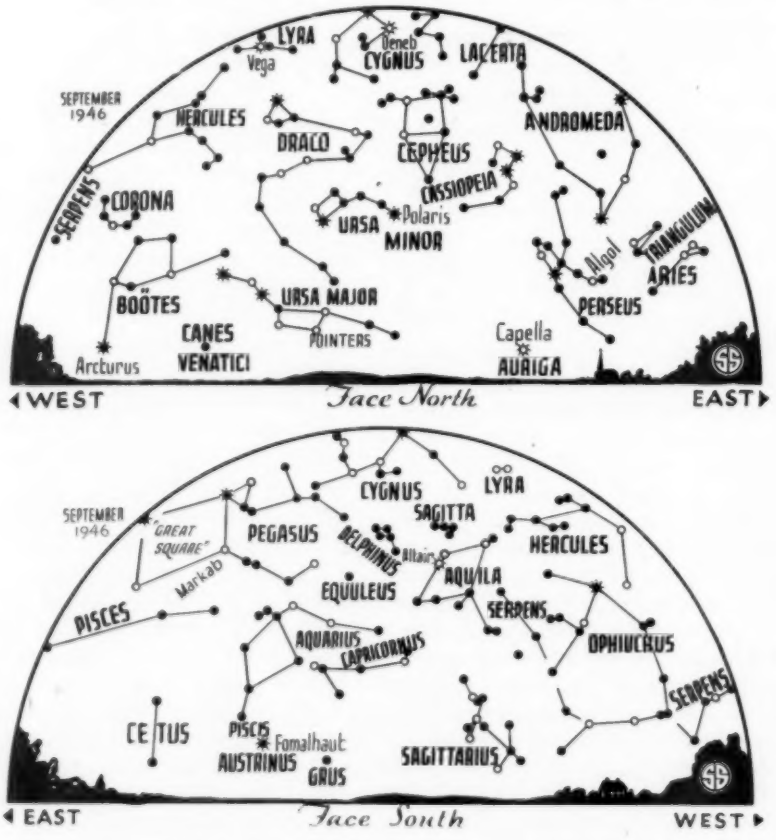
Mars and Jupiter also are in the sky in September, and in the figure of Virga, the same as Venus. However, they are even closer to the sun than Venus. For that reason and because they are fainter they are still harder to see. On Sept. 3 Venus passes Jupiter, so that they will help locate it. Mars passes Jupiter on the 24th. Jupiter is of magnitude minus 1.3 which exceeds any of the stars but Mars is fainter, even, than any of the six stars mentioned above, with magnitude plus 1.8.

Though nothing happens in the sky on that date, Sept. 23 is important in the history of astronomy, especially this year, since it is the centenary of one of the greatest discoveries in science—and one that involved quite dramatic circumstances. It was on Sept. 23, 1846, that the planet Neptune was first observed, after its presence and position had been predicted by unprecedented mathematical techniques.

The theory of gravitation, which was published by Isaac Newton in 1687, had shown that this force acts throughout the universe and that each of the planets exerts an attraction on all the others. Thus, in calculating the orbits of the planets, the movements of the others had to be considered, but this was done with great success.

In 1781, using a small telescope which he had made himself, William Herschel, in England, discovered the planet Uranus. This was actually the first planet to be "discovered," since all the others are visible to the naked eye and had been known from antiquity. After Uranus had been observed for several years astronomers calculated its orbit and found that it revolves around the sun once in 84 years, at an average distance of 1,800,000,000 miles.

However, early in the nineteenth century, it was found that there were some discrepancies in its motion. Even allowing for the attraction of the other known planets it did not go quite where it was expected to travel. This kept getting worse and worse, until by 1845 it was about two minutes of arc out of place. This is only about a fifteenth of the moon's apparent diameter, but an amount that is astronomically intolerable.



It was about this time that two astronomers, a 26-year-old Englishman named John Couch Adams, and a Frenchman, Urbain Jean Joseph Leverrier (aged 34 years), independently came to the conclusion that this was caused by a still more distant, and undiscovered, planet, of which the gravitational pull had not been considered.

Unprecedented Problem

Knowing where a planet was, astronomers had worked out the technique of ascertaining its perturbations on other planets, but the idea now was to do the reverse and, from the perturbations, to figure out the place of the planet that caused it. This was an exceedingly difficult and unprecedented problem, but in September, 1845, Adams finished some preliminary results and sent them to Prof. Challis, at Cambridge. A month later he had his final results, which gave the supposed position of the unknown planet, and sent these to Sir George Airy, the Astronomer Royal, at Greenwich.

Ignorant of this work, Leverrier in November, 1845, gave a preliminary paper in which he showed that the effects of the then known planets were not sufficient to explain the curious movement of Uranus. On June 1, 1846, he followed this with a second paper, giving for the disturbing planet a position that was within a degree—about two moon diameters—of the place where Adams had placed it.

On Sept. 3 Adams sent Airy a third paper, giving revised results, but still nothing was done about it. At first, apparently, the English astronomers had not a very high opinion of Adams' work. Also, there was the difficulty of locating the faint and moving planet among a horde of fixed stars. This was before the modern days of photography, when two plates, exposed on succeeding nights, would quickly reveal the wandering object.

A few weeks before this Leverrier, likewise, had issued a third paper, but this did not reach England until the end of September. When it did, and the English astronomers noticed the similarity to Adams' figures, they evidently had more respect for them and began to make observations with a view to locating the wanderer. But it was too late. A copy of the Leverrier paper reached J. G. Galle, at the University of Berlin, on Sept. 23.

Fortunately, he happened to have a new star map covering the region of Aquarius, where the planet was supposed to be, and showing the permanent residents of that constellation. This would make it easy to find the stranger. The night was clear, he turned his telescope towards Aquarius, and there it was!

Discoverers Share Honors

Naturally, there was great controversy between England and France as to who had discovered the planet, but now history's version is that both Adams and Leverrier share the honors—along with Sir Isaac Newton, whose genius, as Alfred Noyes has said, "found the law that was a lantern to their feet."

In September Neptune is in the constellation of Virgo, and too close to the sun to be observed, even with a telescope. Its magnitude is about 7.7 well below the limit of naked eye visibility. It travels once around the sun in 165 years, at a distance of 2,793,000,000 miles. Its diameter is 31,000 miles, and it is equipped with one satellite, probably bigger than our moon.

Celestial Time Table for September

Sept.	EST	
3	9:49 a. m.	Moon in first quarter
	2:00 p. m.	Moon farthest; distance 251,100 miles
	10:00 p. m.	Venus passes Jupiter
8	10:00 a. m.	Venus farthest east of sun
11	4:59 a. m.	Full moon
16	5:00 a. m.	Moon nearest; distance 229,400 miles
18	1:44 a. m.	Moon in last quarter
20	10:36 p. m.	Moon passes Saturn
23	10:41 a. m.	Autumn commences
24	11:00 p. m.	Mars passes Jupiter
25	3:45 a. m.	New moon
27	8:13 a. m.	Moon passes Jupiter
	10:35 a.m.	Moon passes Mars
28	7:26 p. m.	Moon passes Venus

Subtract one hour for CST, two hours for MST, and three for PST. Add one hour for the corresponding Daylight Saving time.

Science News Letter, August 31, 1946

RADIO

New Insect Repellent Is CBS Radio Feature

➤ A NEW double-action repellent called 448 that both repels and kills insects will be described on the Science Service radio program, "Adventures in Science," over many of the stations of the Columbia Broadcasting System next Saturday, Sept. 7.

Lieut. Comdr. Michael Pijoan of the Naval Medical Research Institute will be the guest of Watson Davis, director of Science Service, on the program.

The program will be heard at 1:45 p. m. EST., 2:45 p. m. EDST.

Science News Letter, August 31, 1946

MEDICINE

Insulin Aids in Treatment of Alcoholics

➤ ACUTE alcoholics, treated with insulin, can be lured away from drink twice as fast and with greater ease and comfort than by the usual method of gradually withdrawing alcohol from the diet, Dr. Etem G. Vassaf and Dr. Volta R. Hall, of the Ring Sanatorium and Hospital, Arlington, Mass., have found.

Small doses of insulin were given two or three times daily before meals to 43 patients whose "lost weekends" varied from two days to three months. The patients, 29 of whom were men and 14 women, were forced to drink plenty of fruit juices, in a diet of high-calorie and high-vitamin foods. Those who showed signs of tremors, excessive sweating, confusion, or disorientation, were also given injections of vitamin B_1.

Of the patients, 44% required no alcohol after receiving insulin, while in a group of 564 patients who were not given insulin, only 14% could give up whisky at once. The average withdrawal period for the insulin patients was one day, slightly less than half the 2.2 days required by the average alcoholic receiving no insulin.

Nursing and medical staffs agreed that the patients receiving insulin were more contented and cooperative, less restless and fault-finding, and less insistent in their demands for alcohol than were the control patients.

Scientists have long known that the burning of alcohol and its consequent disappearance from the body may be speeded by the catalytic action of simultaneous oxidation or burning of sugar. Drunks, completely "out" in a serious alcoholic coma, have been sobered up in two hours or less and able to walk alone within four hours by injection of both sugar and insulin.

Insulin, administered alone, will speed up the oxidation of blood sugar, otherwise dormant when alcohol is present, and this, in turn, speeds up the elimination of the alcohol itself.

Drs. Vassaf and Hall, reporting their studies to the *New England Journal of Medicine* (Aug. 8), suggest greater future use of insulin in treatment of acute alcoholism.

Science News Letter, August 31, 1946

Ascarids, internal parasitic worms, may be 90% destroyed without injury to swine, by sodium fluoride in their food.

Do You Know?

Starfish *meal* compares favorably with sardine meal as chicken feed.

Astronomers have given names, Greek letters, or numbers to all stars visible to the naked eye.

Instead of laying eggs, the *fly* that causes African sleeping sickness gives birth to one fly.

The successful use of *sulfa drugs* for X-disease on peaches is an example of the new trend toward "artificial immunization" of plants against diseases.

Synthetic esters were made and used in Germany during the war for improving the lubricating properties of special oils for use in cold weather.

One American *turkey farm* has modernized its killing process by using electricity; birds are electrocuted with 450 volts in from five to 15 seconds.

In a properly *air conditioned* home, the absence of warping causes the piano to stay tuned longer, and the doors and windows to open and close easier.

Clothing industries, this year, expect to produce 30,000,000 suits for men; this is 5,000,000 more than the normal yearly production.

The 200-inch *reflector* being prepared for the Mount Palomar telescope will enable astronomers to penetrate twice as far into space and cover eight times the volume of space now open to them.

Sectionalized plywood *barges* proved satisfactory during the war for transporting petroleum products in rivers and along the coast; the sections, bound together by connector bolts, were lined with a synthetic rubber compound.

NEW SUPER 40 POWER TELESCOPE

Not a toy but a precision instrument with 4 variable powers: 10X, 20X, 30X and 40X. Has 53 mm. objective lens, fully achromatic. For nearby objects at wide range; target spotting scope; long distance terrestrial view; for spotting planes, ships & studying stars. Size 27½" extended; 9½" collapsed. Weight 28½ ozs. Price prepaid $42.50. Write Dept. 11.

Carl Halle Optical Products
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METEOROLOGY

Weather Stations Abroad

➤ FAR-FLUNG weather stations outside the continental United States are being maintained by the U. S. Weather Bureau to aid transcontinental and transoceanic flying, and hourly reports of weather conditions are being received from stations of other nations. Additional observatories will be established both in American possessions and on foreign soil in cooperation with the countries concerned as found needed. These latter will be operated by the U. S. Weather Bureau only until local personnel have been trained.

Weather Bureau activities also have increased over prewar days within the United States. The Bureau has taken over weather stations at Army posts, now on a caretaker basis, at home as well as abroad. In fact, the Weather Bureau has authority, by order of the President, to take these stations where the needs of international airlines make such action essential. These home stations, added to prewar observatories, give better coverage than ever before.

The Weather Bureau has stations in operation in Alaska and the Aleutians. The Bureau exchanges reports from a hundred stations daily with Russia. The Soviet Union, the U. S. Bureau states, has been very cooperative in converting her reports for use in our historical maps of the northern hemisphere, which are used in long range forecasting and many research projects.

The proposed establishment of additional joint Canadian-United States meteorological stations in far northern Canada is awaiting a complete survey. The purpose of such stations, many of which would be temporary only, is to secure data for the Canadian-United States Joint Defense Board.

Denmark has agreed to let the United States establish a weather station in the northwestern part of Greenland, it is reported. It will be operated by civilians. Among other places for permanent stations are Guam, Wake, the Philippines and Canton island in the Pacific, and Caribbean areas in the Atlantic.

Alaskan and Aleutian stations are essential now that the Great Circle route from the United States to Japan and China is beginning to be used. The fogs and winds that prevail along the Aleutians could cause great difficulties unless pilots were prewarned. The Alaskan stations, together with others in northern Canada are essential in studying the possibilities of the Polar route from the Western Hemisphere to parts of Europe and Asia.

Greenland stations are an aid on the present short route to Europe by way of Newfoundland and Iceland; those in the Caribbean, to air transportation to South America; and those on Wake, Guam and the Philippines for travel to southern Asia and Australia via Hawaii.

Science News Letter, August 31, 1946

GEOGRAPHY

Alaska Crossroads For World Flying

➤ ALASKA SEEMS destined to become a crossroads in transoceanic flying; its importance in future aviation is now recognized by an allotment of federal money for airport construction.

The allotment just announced by the Civil Aeronautics Administration is for $1,740,000 for the present year for Alaska, Hawaii and Puerto Rico. The amount may seem small, but when added to millions already spent in constructing airports by the Army during the war, it will go far.

Alaska's importance in transoceanic flying is largely geographical. It lies on or close to the Great Circle routes from American airports to Japan, China, Siberia and other parts of eastern Asia. It is also not far from routes from the West Coast by way of the North Pole to much of Europe and Asia. The Great Circle route to Tokyo, by way of the Alaskan Aleutians, is now in use. The Polar route is under study, and some day may play an important role in air transportation.

Added to the favorable geographical position of Alaska, and the Aleutians, the country has another potential asset of great value in long distance flying. It may be able to refuel crossing planes with domestic gasoline. Drills are now penetrating the earth in the Point Barrow general area exploring to find the petroleum that geologists claim is there. The drillings are being made by the U. S. Navy in an area set aside as a Naval petroleum reserve by President Harding more than two decades ago. If pay-oil is found, a pipeline to Fairbanks and the south coast will be laid.

Science News Letter, August 31, 1946

AGRICULTURE

Soviet Cotton Grows Red

Cotton grown in Russia has fibers naturally tinted red, brown and green. The fibers are short and coarse, but colors do not fade easily.

▸ SOVIET cotton fields are now producing experimentally naturally tinted fibers of brown, red, and green.

These cottons colored by nature fade less than white fibers that are artificially dyed and they have greater resistance against decay, it is claimed in a report prepared for Science Service by N. Konstantinov of the Soviet Scientists' Antifascist Committee.

In a number of cases the chemical nature of naturally colored cotton was established. The brown color of the fibers is caused by a special organic substance of tannin type, so-called catechol. On contact with oxygen in the air the tanning matter is oxidized and forms brown and red amorphous substances which give color to fiber.

Colored fibers have particularly high wax content. According to data of the Moscow Textile Institute, in green-fibered cotton plants this equals 7% to 10% and in white-fibered species 0.7%. The presence of tanning matter and fatty wax substances in fibers gives greater resistance against decay.

It is well known, the report says, that in artificially dyed white fibers the quality deteriorates. Hence fabrics manufactured from naturally colored fibers should be of relatively better quality. Finally, it has been established that such fabrics fade less than those made of artificially dyed white fibers.

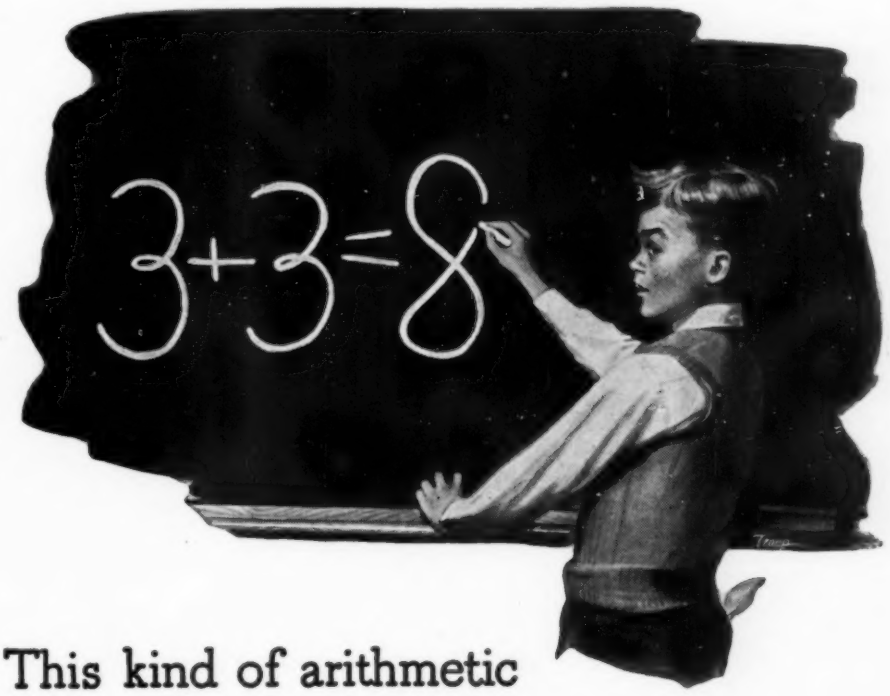
The selection of cotton plants with naturally colored fibers was begun in the USSR with the study of such species met with in nature. From among a valuable collection of cotton plants, a fairly large number of species with colored fibers were chosen. These varied from cream through all shades of brown to almost black and included reddish and greenish tints.

Tests proved that in the majority of cases these fibers were short and coarse, and that crop yield was low. Plant breeders were confronted with the task of improving technological properties of naturally-colored fibers. In recent years considerable successes have been achieved in this direction.

By crossing American cotton plants with naturally colored fibers and white fiber plant of the same type, B. Straumal of All-Union Cotton Cultivation Research Institute succeeded in a comparatively short time in obtaining a number of brown-hued staples of excellent technological properties, closely approaching those of the best white-fibered varieties. Scientist Straumal's varieties ripen early and yield fairly good crops. The length of staple is 30 millimeters (1⅛ inch); yield after ginning up to 35% and tensile strength six to seven grains.

A valuable property of these cotton plants is their good resistance to wilt, and these varieties are being propagated for cultivation in fields. Tests of the Straumal varieties showed that catechol when reinforced by salts of iron, copper and chromium gives color to fabrics in no way inferior to the best artificial dyes. Catechol makes it possible to vary shades and gives good decay-resisting properties to fiber. According to specialists, this fiber can be used without additional dyeing for manufacture of colored fabrics.

Of exceptional interest is work carried out by I. Maximenko, selectionist of Turkmenian Soviet Republic, on species of cotton plants with green fibers. As a result of crossing cotton plants of purpurescence type with American and American with (*Turn to page 143*)



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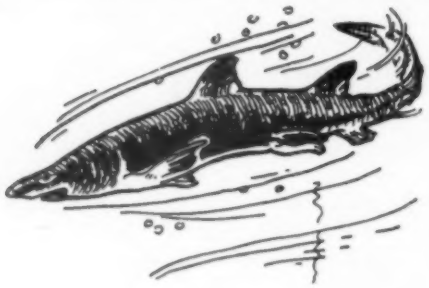
SAVE THE EASY WAY... BUY YOUR BONDS THROUGH PAYROLL SAVINGS

ICHTHYOLOGY

NATURE RAMBLINGS *by Frank Thone*



Toothy Aristocrats

➤ THE FRIENDLESS estate of sharks is not a matter of their being parvenus. If length of lineage were the only criterion, sharks would have to be reckoned among the highest aristocracy among backboned animals. There were sharks in the sea long before any kind of vertebrates came to live on land, and they were recognizable as sharks when other fish seemed to be uncertain whether they were going to be fish at all.

Sharks set themselves up in the aristocrat business as many another family has done in later time: by having good weapons and using them ruthlessly. Sharks' teeth are so efficient, indeed, that many island tribes in the South Seas, having no metals or hard stones, made their wooden war clubs the practical equivalent of swords by edging them with these three-cornered dental daggers.

The primitive shark tooth is a triangle, with its cutting edges finely sawtoothed. Loosely attached at the base, it comes loose readily if damaged by an over-ambitious bite, and falls out after a time in any case. There are plenty of replacements; most sharks have several rows of unerupted teeth in their jaws, waiting their turn. There are variants upon this pattern, but all recognizable as belonging to the family.

So much notice has been taken of the teeth of the sharks because they strongly present the shark's chief function—that of an eating-machine. A shark is always hungry, and he is always hunting. Sharks sometimes hunt in small packs, like wolves, and like wolves will turn and rend and devour any member of the pack that gets hurt.

For all their horrid appearence and unappealing ways, sharks have a decided place of their own in the world. Like the wolves to which they are often likened, they keep down the surplus of the teeming life of the sea, and (since their appetites are anything but finicky) they are at once garbage collectors and living incinerators.

Science News Letter, August 31, 1946

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AERONAUTICS

Parallel Radio Beams Determine True Air Speed

➤ AN AIRPLANE'S true speed is determined accurately with radio detection beams on the Army Air Forces' speed course at Wright Field, Ohio. Three parallel beams at right angles to the course do the trick.

The speeding planes cut these beams as they pass over the course, and as they cut each beam send a signal to the ground. The time elapse between the signals is compared with the known distance between the beams, and the speed computed. The method may be used with either high- or low-flying planes.

Numerous other methods have been used to measure true air speed, but all were found to have limitations. Various types of instruments installed in planes give approximate but not true speed. A radar system which followed the plane in flight was not sufficiently accurate, while a method of timing by use of vertical wires, cameras and a timing motor was effecctive only at low altitudes.

The radio beam method operates accurately in any weather and at any altitude, and is the first system capable of measuring speed at or above the speed of sound. A similar installation at Muroc Army Air Base, Calif., will be used to check the speed of rockets and pilotless aircraft.

Science News Letter, August 31, 1946

***PORTRAIT OF HAY FEVER—** This needle-pointed black blob is a ragweed pollen grain magnified 12,000 times life size before an electronic microscope camera in the Westinghouse Research Laboratories. In real life the little fiend is one-half of one-thousandth of an inch across, and it floats around the country by the billion, causing sniffling torment to some 3,000,000 tender-membraned American sufferers from hay fever.*

BOTANY

Counting Pollen Grains In Air Not Exact Science

➤ COUNTING pollen grains in the air, which has become a standard public-health job during hay-fever season, is still far from being an exact science. This is indicated by critical studies by Oren C. Durham, technical director of the Abbott Laboratories in North Chicago.

The method now most widely used consists simply in exposing an oiled glass plate for a given length of time, then putting it under a microscope and counting the pollen grains that have stuck to it. This gives a false picture of the pollen content of the air itself, because the rate of fall of the grains differs widely from species to species. Ragweed pollen, for example, falls only one-fifth as fast as rye pollen under carefully controlled still-air conditions.

Mr. Durham has devised collecting apparatus intended to increase the accuracy of air-pollen analysis. He puts the standard oiled glass slide between two large metal plates, which insure that only pollen grains from the air passing between them can fall on the slide.

Science News Letter, August 31, 1946

Books of the Week

ADVANCES IN COLLOID SCIENCE: Vol. II: Scientific Progress in the Field of Rubber and Synthetic Elastomers—H. Mark and G. S. Whitby, Eds., *Interscience Pub., Inc.,* 453 p., tables and illus., $7. A book useful in assisting in the further study of synthetic rubbers and of elastomers generally, as well as of natural rubbers.

ADVENTURES IN TIME AND SPACE: An Anthology of Modern Science-Fiction Stories—R. J. Healy and J. F. McComas, Eds., *Random House,* 997 p., $2.95. A collection of thirty-four stories, wherein the caution of the scientist gives way to the imagination of the writer.

COLLECTION AND PRESERVATION OF INSECTS—*Government Printing Office,* 42 p., diagrs. and illus., paper, 15 cents. Information on the collecting, preserving, handling, mounting and labeling of insect specimens. U. S. Dept. of Agriculture Misc. Pub. No. 601.

EDUCATORS GUIDE TO FREE FILMS—Mary F. Horkheimer and John W. Diffor, Eds., *Educators Progress Service,* 303 p., $4.

ELECTRIC MOTOR REPAIR—Robert Rosenberg—*Murray Hill Books*—351 p., illus., $5. An intensely practical, non-theoretical book on electric-motor repair and rewinding that can be used by men with little background of electrical knowledge.

ELEMENTARY TEACHERS GUIDE TO FREE CURRICULUM MATERIALS—John Guy Fowlkes and Donald A. Morgan, Eds., *Educators Progress Service,* 204 p., paper, $3.50, third ed.

ELEPHANTS—Herbert S. Zim—*Morrow*—illus., $2. A book that tells with clear simplicity and accuracy all about elephants. It will appeal strongly to younger readers with its simple text and large, clear type, but it is also interesting reading for any age.

FIRST ANNUAL REPORT OF THE DIRECTOR-GENERAL TO THE FAO CONFERENCE—*Food and Agriculture Organization of the United Nations,* 45 p., paper, free.

THE FLAGELLATE SUBFAMILY OXYMONADINAE—Joy Barnes—*University of California Press,* 162 p., paper, $1.25.

GENERAL BIOLOGY—William C. Beaver—*Mosby*— 820 p., tables and illus., $4.75. A textbook which places emphasis on human biology, penicillin and the other antibiotics, viruses, economically important parasitic worms, the pronunciation and derivation of terms, and human diseases produced by parasitic fungi.

MUSIC IN HOSPITALS—Willem van de Wall—*Russell Sage Foundation*—86 p., paper, $1. A handbook for those who wish to make their musical contribution to hospitals.

NON-PROJECTIVE PERSONALITY TESTS—Roy Waldo Miner, ed., *The New York Academy of Sciences,* 147 p., paper, $1.75. Vol. XLVI, Art. 7.

OPINIONS ON GAINS FOR AMERICAN EDUCATION FROM WARTIME ARMED SERVICES TRAINING—M. M. Chambers—*American Council on Education*—78 p., paper, 50 cents. A report on the experience and observations of war-veteran students, pointing up some of the possible gains for American education from the huge wartime-training effort.

PERSONALITY PLUS—Sheila John Daly—*Dodd, Mead & Co.*—139 p., illus., $2. Hints on the correct behavior for teen-agers by a teen-ager.

PREPARATION OF AMMONIUM NITRATE FOR USE AS A FERTILIZER—*Government Printing Office*—80 p., tables and illus., paper, 20 cents. U. S. Department of Agriculture, Technical Bulletin No. 912—June 1946.

REEF AND SHORE FAUNA OF HAWAII—Charles H. Edmondson—*Bernice P. Bishop Museum*—381 p., illus., paper, $3. A condensed pictorial treatise on the marine fauna of Hawaii. Special Publication 22.

WORLD FOOD SURVEY—*Food and Agriculture Organization of the United Nations*—39 p., tables and diagrs., paper, free. July 5, 1946.

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POLITICS

UN Committee Planning International Standards

➤ A LITTLE-KNOWN but potentially important United Nations organization is the UN's Standard Coordinating Committee that is planning international standards for such varied items as airfield lighting and textiles.

Newest of the 18 members of the committee is Russia, and the draft for a permanent international standards group is now being studied by the members in preparation for a conference in London in October.

Latest project submitted to the group includes 94 test methods for textiles, proposed by the American Standards Association.

Other projects for international standardization under consideration by the UN committee include: metal food containers; definition of the term rayon; manganese ore test methods; terms and definitions relating to the heat treatment of steel; plastics terminology; radio interference suppression; airfield lighting; simplification of shellac grades and methods of testing the properties of shellac; standard for sheet and wire gages; machine tools; automobile standards; building standards; and several other subjects for possible international definition and testing.

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From Page 141

Egyptian species, and of further careful selection of their offspring with differently colored staples, Maximenko succeeded in obtaining absolutely new shades hitherto unknown in nature. According to Maximenko's research, the green color of cotton fiber is not chlorophyl and differs in nature from brown coloring. This is indicated by the manner in which the colors appear. Whereas brown, according to Maximenko's observations, appears within 20 to 25 days of beginning of formation of ball, green appears within 30 to 40 days. It was also established that the green coloring changes easily under influence of external factors. For instance, given surplus moisture, green will become almost black and, on the contrary, with insufficient moisture it becomes lighter.

Outstanding shortcomings inherent to green fiber cotton plants are their low crop yield and weakness of fiber. These were successfully overcome by Maximenko. Varieties which he selected from hybrids are already yielding fiber with a higher tensile strength.

Science News Letter, August 31, 1946

Books

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•New Machines And Gadgets•

⚙ *NOZZLE VALVE for garden hose starts, regulates and stops the flow of water by the position of the hand holding it. The valve is in a short length of hose coupled in the line just behind the regular nozzle. It cuts off the water as effectively as the faucet to which the hose is attached.*

Science News Letter, August 31, 1946

⚙ *TABLE COVER, made of a thin, transparent, tough plastic, protects a linen cloth, yet allows the pattern to show through. Spills and stains do not penetrate it, and can be wiped off with a damp cloth. The plastic film drapes softly and falls with the folds of the linen.*

Science News Letter, August 31, 1946

⚙ *SIDE WALLS of glass fiber, aluminum and steel are used in certain laboratories to shield electrical experiments within from outside atmospheric electricity. Prefabricated panels have a layer of glass fiber between a flat sheet of aluminum and a fluted sheet of steel.*

Science News Letter, August 31, 1946

⚙ *PHOTOPHONE, used by the German Army, provides for short-distancce voice communication over a beam of light. It uses a narrow beam of white, red or invisible infra-red waves. The sending equipment looks like a pair of oversized binoculars on a tripod. The receiver uses a photoelectric cell and amplifiers.*

Science News Letter, August 31, 1946

⚙ *FLUORESCENT nursery lamp gives a pastel-colored glow, too soft to disturb sleep but light enough for parents to see their sleeping children at night. Made of a zinc alloy coated with chip-proof baked enamel, it comes in bear and kitten designs.*

Science News Letter, August 31, 1946

⚙ *BARBECUE equipment for picnics is a complete unit, mounted on two wheels and moved around with a handle bar. It contains a fire box and grill, and a working table with trays below for provisions, tools and ice cubes. Constructed of stainless aluminum, it also has a built-in warming oven.*

Science News Letter, August 31, 1946

⚙ *RADIOACTIVITY detector, almost small enough to slide into an overcoat pocket, is a complete unit with battery. It can locate radioactive ores and evaluate their strength, locate lost radium, and indicate conditions unsafe because of radioactivity. It uses a Geiger-Muller counter tube.*

Science News Letter, August 31, 1946

⚙ *WRIST PURSE has a place for folded money with an opening on the under side and holds an ordinary wrist watch on its face. In appearance it resembles a wide watch band, and does not indicate that it has a hidden money pocket.*

Science News Letter, August 31, 1946

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, *1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 326. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.*

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